

## THE PROTEACEÆ OF AUSTRALIA.

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The late William Forster, M.P., in his paper on "*Australian Autochthony*," published in the *Sydney University Review* (1882), when referring to the *Proteaceæ* remarks:—"The *Proteaceæ* constitute in themselves, as it were, a microcosm of orders, comprising a number of sub-divisions, each of which seems, as if, under favourable circumstances, it might have developed into a separate order, and which, by agreeing to differ, strike one at first sight as if they had been classified, not so much by their resemblances to, or affinities with each other, as by their differences or divergences from other groups, though doubtless a close, and more strict comparison reveals essential affinities." A casual observer might naturally adopt this view of the order; but, though the species differ widely from each other in appearance, and suggest alliances with other orders, there is in reality a bond of union which separates them from the rest of the vegetable kingdom and binds them closely together. The name of the order is, indeed, highly appropriate, for the species are *protean* in their character, ranging from mere herbs to large trees, exhibiting an inflorescence differing very much in colour and arrangement, and occurring from the immediate vicinity of the sea-coast to the summits of mountains. According to the eminent R. Brown, the *Proteaceæ* have the radicle always pointing towards the base of the fruit, this distinguishing it from the orders nearly allied, such for instance as the *Thymelaceæ* and *Lauraceæ*, which have the radicle short and superior. But independently of this mark of difference, the order is easily recognized by the harsh, woody texture of the leaves, the irregular tubular calyxes with a valvate æstivation, the position of the four stamens on the divisions of the calyx, the bursting of the anthers longitudinally, and the erect disposition of the ovules. The characters of the species are in some genera so well defined, that even in a fossilised state they may be referred to their appropriate

places in the vegetable kingdom. Sir J. D. Hooker in his essay on the Flora of Australia (1859) states that "in the Bag-shot sands some silicified wood has been found, which may confidently be referred to *Banksia*, and which is in fact scarcely distinguishable from recent and fossil *Banksia* wood;" and he further adds "Wesel and Weber describe from the brown coal of the Rhine a rich and varied Flora, representing, &c., &c., &c., some of the peculiar and characteristic genera of the Australian, South African, American, Indian, and European Floras" A more recent writer affirms that all the family of the Proteaceæ, comprehending *Banksia*, *Hakea*, *Grevillea*, existed in Europe during the tertiary period, and that some of the fruits bear a marked resemblance to certain species now found in Australia. At the present period of the world's history the geographical distribution of the order is somewhat perplexing, for whilst the species are most abundant in Australia and South Africa, extending on the one hand to New Caledonia, the Indian Archipelago, and tropical Asia and Japan, and on the other to the Andes of South America—none of the Australian and African species are identical, nor do any of those with indehiscent fruit extend to America or Asia. Whilst, therefore, the species described in the *Flora Australiensis* are strictly indigenous, the relation to the African Flora is simply tribal or generic, so that Mr. Bentham, speaking in general terms without any reference to the Flora of other geological periods, was of opinion that "the great mass of purely Australian species and endemic genera must have originated or been differentiated in Australia, and never have spread for out of it."

Now that, through the labours of Mr. Bentham and Baron Mueller, we are enabled to take a general view of the *Proteaceæ* in Australia, it appears that the known species of the order in this continent amount to nearly 600, and that about two-thirds of that number are found in Western Australia. The genera peculiar to that colony are *Simsia*, *Synaphea*, *Franklandia* and *Dryandra*; whilst of *Adenanthos*, *A. sericeus* occurs in South Australia, and *A. terminalis* in South Australia and Victoria, and of *Lambertia*, *L. formosa* in New South Wales.

The western genera and species are thus arranged in Baron Mueller's census.

1. <i>Petrophila</i> .....	33 species.
2. <i>Isopogon</i> .....	25
3. <i>Adenanthos</i> .....	14
4. <i>Simsia</i> .. ....	5
5. <i>Synaphea</i> .....	8
6. <i>Conospermum</i> .....	26
7. <i>Franklandia</i> .....	2
8. <i>Persoonia</i> .....	24
9. <i>Xylomelum</i> .....	2
10. <i>Lambertia</i> .....	8
11. <i>Strangea</i> .....	1
12. <i>Grevillea</i> .....	90
13. <i>Hakea</i> .....	68
14. <i>Banksia</i> .....	36
15. <i>Dryandra</i> .....	47

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Next to West Australia, N. S. Wales has the greatest number of species, but as will be seen by the subjoined list, some of the genera are but poorly represented, though the Waratah (*Telopea speciosissima*), regarded by some as the finest of Australian flowers, is peculiar to this colony :—

<i>Petrophila</i> .....	3 species.
<i>Isopogon</i> .....	4
<i>Conospermum</i> .....	7
<i>Symphyonema</i> .....	2
<i>Persoonia</i> .....	32
<i>Macadamia</i> .....	1
<i>Helicia</i> .....	4
<i>Xylomelum</i> .....	1
<i>Lambertia</i> .....	1
<i>Orites</i> .....	1
<i>Strangea</i> .....	1
<i>Grevillea</i> .....	39
<i>Hakea</i> .....	14
<i>Stenocarpus</i> .....	2
<i>Lomatia</i> .....	3
<i>Telopea</i> .....	1
<i>Banksia</i> .....	8

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Thus it appears, that in N. S. Wales the species are not one third of those in W. Australia, whilst Queensland, Victoria, S. Australia, N. Australia and Tasmania have respectively, so far as yet known—59, 51, 33, 33 and 23. *Banksia*, *Hakea*, and *Grevillea* are common to all Australian Colonies and Tasmania, whilst the first has been found on S.E. of New Guinea (F. v. M., Papuan Plants, p. 18.) *Dryandra*, which differs from *Banksia* principally in having an involucre of numerous bracts, is exclusively a western genus, and so remarkable for the uniformity of its flowers, that Mr. Bentham found it difficult to establish any definite sections. No species of this genus has travelled accidentally out of its peculiar region. *Symphyonema*, in its two species of *S. montanum* and *S. paludosum*, has not been found beyond the limits of New South Wales, whilst *Bellendenia*, *Agastachys* and *Cenarrhenes*, each represented by a single species, are peculiar to Tasmania. *Hakea cycloptera* seems limited to a small area in South Australia, but *H. multilinata* which is beautifully figured amongst Brown's "*Forest Plants of South Australia*," and was supposed to have migrated as a solitary species from the west, has recently been met with in the north (F. v. M.) There is something remarkable in the distribution of the *Proteaceae* in Australia. Allan Cunningham who accompanied the late Admiral King in his survey of the north-western coasts of the continent, was of opinion that in that region the order was limited to *Grevillea*, *Hakea* and *Personia*, and, further, that *Banksia* was not represented there. He says:—"Viewing the general distribution of *Banksia* it is a singular fact in the geographical distribution of this genus, that its species, which have been traced through almost every meridian of the south coast, upon the Islands of Bass's Strait, in Van Diemen's Land, and widely scattered throughout the whole extent of New South Wales to the south coast, at which extreme of the continent *B. dentata* has been observed as far west as longitude 130° east, should be wholly wanting as the north-west coast." He then adds "Our limited knowledge of the west coast (properly so called) does not afford us materials to hazard even a particular conclusion relative to the existence of this family on its shores, excepting that,

from the total absence of any one plant of *Proteaceæ* at those parts of Rottneest and Dirk Hartog's Islands visited during the Bathurst's voyage, an inference may be drawn of the general paucity of any part of the order on the shores of the neighbouring main." Since the days of CUNNINGHAM, who, amidst many discouragements and disappointments, did so much to promote the knowledge of Australian vegetation, our views have been somewhat modified as to the distribution of the *Proteaceæ* and the genera prevalent in particular regions. Baron Mueller, when in company with A. C. Gregory, in 1856, illustrated the Flora of Arnhem's land by the record of some 800 species of plants, amongst which he mentions 45 species of *Proteaceæ*, including *Conospermum* (1), *Helicia* (1), *Persoonia* (5), *Orites* (1), *Grevillea* (22), *Hakea* (7), *Lomatia* (1), *Stenocarpus* (2), and *Banksia* (5). *Banksia Dentata* he found at the mouth of the Victoria river, whilst he saw specimens of the same species from the promontory Escape Cliffs. (Frag., Vol. 7, p. 57.) In the *Flora Australiensis*, Vol. 5, p. 555, it is also recorded from the Glenelg River (125° E.) The only Proteaceous plants collected at Nickol Bay and the Murchison River, by Mr. Pemberton Walcott and Mr. Maitland Brown in 1861, were *Hakea lorea* (R. Br.) and *Grevillea Wickhami* (Meissn.), but several species of *Banksia* (*B. sphaerocarpa*, *B. Menziesii*, and *B. Lindleyana*) are known from the latter locality. In the recent list of Western Australian Plants, 1883, collected by the Hon. John Forrest, at Shark's Bay and its vicinity, *Banksia* is not enumerated, but the following species appear to be indigenous there, as specimens of them were seen and examined by Baron Mueller:—

- Conospermum Stachadis*, Endl.
- Grevillea pterosperma* (F. v. M.)
  - stenobotrya* (F. v. M.)
  - chrysodendron* (R. Br.)
  - annulifera* (F. v. M.)
  - leucopteris* (Meissn.)
  - striata* (R. Br.)
  - deflexa* (F. v. M.)
- Hakea Cunninghamsii* (R. Br.)

Professor Lindley (*Vegetable Kingdom*, p. 533), characterises the *Proteaceæ* as one of the most useless orders to man. But this opinion must be modified, as well as that which regards the geographical distribution of its species, for whilst many of them play an important part in the economy of nature—growing in sandy, sterile, and exposed places where other plants could not exist, and preparing the way for a higher order of vegetation, some of the species are now utilised for the value of their timber, the industrial properties of their barks, the various products extracted from them by distillation, and the fruits, which may probably be improved by cultivation. Amongst the woods prepared by the late Sir W. Macarthur for the Paris Universal Exhibition, 1867, those of the following trees are enumerated with greater or less commendation :—

*Stenocarpus salignus.*  
*Xylomeium pyriforme.*  
*Banksia serrata.*  
*integrifolia.*  
*Grevillea robusta.*  
*Persoonia linearis.*  
*latifolia.*

Mr. Moore, F.L.S., also mentions from the northern districts, in addition to several of those recorded by Sir William :—

*Orites excelsa.*  
*Helicia glabriflora.*  
*H. præalta.*  
*H. ternifolia. (Macadamia.)*  
*Stenocarpus Cunninghami*

In Queensland several species of *Grevillea*, *Banksia* and *Stenocarpus*, are likewise valued for their woods. According to the documents relating to the International Exhibition (1866-67), it is shown that the per centage of tar and the strength of the wood vinegar from some of the *Proteaceæ* bear fair comparison with the results attained in other countries from other trees.

*Banksia Australis* is especially instanced in yielding as 100 parts of its wood, 29·5 of charcoal, 40·062 of crude wood vinegar, 6·562 of tar, and 23·876 of uncondensable gases, while *Banksia serrata* gave 10·8 per cent of tannic acid. The drupaceous fruits of the *Proteaceæ* are for the most part small and insipid, but *Macadamia ternifolia*, or the Queensland nut, bears an edible nut of excellent flavour, whilst the flowers of *Banksia ornata*, *Lambertia formosa*, and some other species are rich in melligenous sap.